Improved C-17 Horizontal Stabilizer Saves Money Through Improved Manufacturing Processes

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Payoff

The Military Products Using Best Commercial/Military Practices (MP-C/MP) pilot program demonstrates that using a relationship based on integrated product teams, incentives via an award fee contract, disciplined innovation, and a maximum performance for price strategy can provide significant benefits to both government and industry. This combined effort demonstrated greater than a 50 percent reduction in acquisition costs and nearly a 20 percent weight reduction in the C-17 horizontal stabilizer outer torque box.

Accomplishment

A revolutionary research and development effort supported by the Materials and Manufacturing Directorate (ML) led to the successful implementation of a less expensive, lighter weight horizontal stabilizer outer torque box in the C-17 aircraft. Designed under the MP-C/MP pilot program, the improved tail component, which accounts for 80 percent of the horizontal structure, demonstrates and validates a host of far-reaching, important innovations directly impacting aerospace business practices, manufacturing infrastructure and process technology. This combined effort by the Boeing Company, Northrop-Grumman, ML, C-17 System Program Office (SPO) and the Air Force Defense Contract Management Command demonstrated greater than a 50 percent reduction in acquisition costs from the baseline cost of 120 aircraft and nearly a 20 percent reduction in component weight.

Background

The objective of the Air Force MP-C/MP program is to develop military products using the best commercial and military practices and extend them throughout the factory to every part designed and manufactured in the enterprise. This in-turn should provide significant gains in product affordability by developing new ways of doing business. To achieve the stated program target goals in the C-17 horizontal stabilizer outer torque box, ML personnel put together a team of product development experts, comprised of both contractor and government personnel. The MP-C/MP's integrated product team used a structured approach for comparing commercial and military practices and processes and documenting cost/benefit analyses and risk assessments. Contrary to popular observation, they found commercial practices were not always best and military practices did not always add significant cost. Further, the team successfully identified, evaluated, refined and documented best commercial/military practices and processes that streamline how a significant acquisition program is run. The new outer torque box incorporates three significant improvements: upper and lower carbon/epoxy skins with integral hat stiffeners; carbon/epoxy front and rear spars with co-bonded stiffeners; and integrally machined clips and brackets as part of the rib design. These improvements reduce overall touch labor, support labor and material requirements. The team also incorporated electronic design tools, modeling and virtual reality into the design process, saving more than two million dollars by eliminating engineering mock-ups.